HAUBER ELEKTRONIK

Vibration Control Type 663

SIL2
PL-d

Standard

Zone-1-21 Ex

Zone-2-22 Ex

Instruction Manual

English

Instruction Manual

Vibration Control Typ 663

Standard
Zone-1-21
Zone-2-22

Edition: 30.03.10

Attention!
Before Start-Up Procedure the Instruction Manual must be read and understood!

Should any question arise, please contact:

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Content

1 Safety Informations.....4

2 Instruction Manual Scope 5

3 The Vibration Control Typ 663.....5
Standard, Zone-1-21, Zone-2-22

4 Intended Use 5

5 Safety Level.....5

6 Documents and Certificates 5

7 Application Fields 6

8 Delivery Contents 6

9 Electrical Data 7

10 Mechanical Data.....8

11 Connections.....9

12 Functional Description 10

13 Limit Value Adjustment.....11

14 Self Check 11

15 Mounting and Demounting 12

15.1 Fastening at the Mounting Surface 12

15.2 Zone-2-22 - Fastening Safety Clip / Protective Cover 13

16 Installation and Start-Up 14

17 Maintenance and Repairs.....14

18 Responsibility for the Safe Operation / Disclaimer 15

1 Safety Instructions

In General

The safety instructions serve the protection of persons and things from damage and danger that arise from not intended use and further misuse of products especially in explosion endangered areas. Therefore read the instruction manual carefully, before working with or starting-up the product. To the operating personnel the instruction manual has to be accessable anytime.

Before the starting-up or miscellaneous works with the product please check, wether all the documents are available completely. If not all the documents are committed completely or futher copies are required, they can be obtained in different languages.

Our product is designed to the latest state of the art. Nevertheless there are a number of residual risks. This means that each person in the operators firm, concerned with mounting and dismounting, installation, start-up, operating or maintanance of the product, has to have read and understood the instruction manual.
This means furthermore that each person in the operators firm, concerned with mounting and dismounting, installation, start-up, operating or maintanance of the product, has to be an authorized expert, familiar with the safety instructions for handling electrical components. For handling ATEX-certified products within explosion endangered surroundings the expert in addition has to be familiar with the safety instructions relevant there.

Used Symbols

This symbol indicates an explosion hazard.

This symbol indicates a risk from electrical current.

This symbol indicates a (non-safety relevant) information.

2 Instruction Manual Scope

The present instruction manual of the Vibration Control Type 663 is applicable for the variants: Standard, Zone-1-21 and Zone-2-22.
The functionality of the variants is identical. In addition the variants have certifications and labellings, that allow operation in explosion endangered areas. (see chap. 7, Operation Areas)

3 Vibration Control Typ 663

The Vibration Control Typ 663 ist applied for measurement and control of machines absolute bearing vibration, referring to DIN ISO 10816. Measurement parameter is the root mean square (rms) of the vibration velocity. The evaluation takes place in two channels independent from each other. An exceeding of the adjustable Limit Value is signalled via relay outputs. This can be used to generate a pre- and a main alarm.
In addition the Typ 663 has an analogue current output. This delivers a direct current from 4...20 mA proportional to the vibration amplitude.

4 Intended Use

The Type 663 serves as protection for machines and mechanical equipment against undue mechanical vibrations. It exclusively serves for measurement of mechanical vibrations.
Main areas of application: Industrial fans, ventilators, blowers, electric motors, pumps, centrifuges, seperators, generators, turbines, and similar mechanical equipment.

5 Safety Level

The Type 663 is tagged by subsequent safety levels:

SIL2 - Safety Integrity Level, SIL2 / FMEDA, nach IEC 61508
PL-d - Performance Level, PL-d, nach DIN ISO 13849

6 Documents and Certificates

Subsequent Type 663 Documents und Certifikates can be consulted on www.hauber-elektronik.de:

- EC-Conformity-Declaration
- Certificate - Safety Integrity Level, SIL2 / FMEDA
- Certificate - Performance Level, PL-d
- EC-Type-Examination-Certification ATEX-Zone 1 und 21, no.: SNCH 09 ATEX 4380
- Statement-of-Conformity ATEX-Zone 2 und 22, no.: LU 09 ATEX 0065X

7 Application Fields

Variant	Application Fields	Labelling
Standard	None explosion endangered Areas	SIL2 PL-d
Zone-1-21	Explosion endangered Areas Zone 1 und 21	SIL2 PL-d **II 2G Ex d IIC T4** **II 2D Ex tD A21 IP65 T120 °C**
Zone-2-22	Explosion endangered Areas Zone 2 und 22	SIL2 PL-d **II 3G Ex nC II T4** **II 3D Ex tD A22 IP55 T125 °C**

8 Delivery Contents

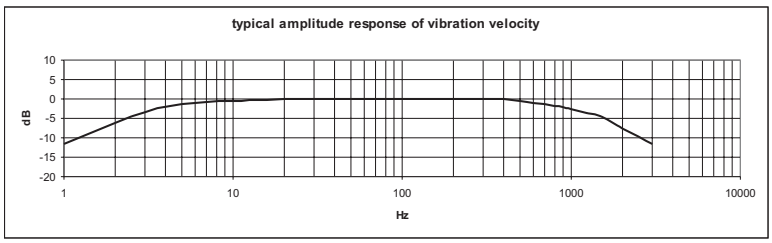
Variant	Delivery Contents
Standard	• Vibration Control Typ 663 • Cylinder Bolt, M8 x 20 mm • Spring Ring, M8 • Instruction Manual
Zone-1-21	• Vibration Control Typ 663, with infused Cable, L= 2 m, 5 m oder 10 m, • Cylinder Bolt, M8 x 20 mm • Spring Ring, M8 • Instruction Manual
Zone-2-22	• Vibration Control Typ 663 • Protective Cover for M12-Plug • Safety Clip • Cylinder Bolt, M8 x 20 mm • Spring Ring, M8 • Instruction Manual
	Available Supplies: • Allocable Mating Connector, M12, 8-pole • Connection Cable, M12-Socket, 8-pole, 0,25 mm^2, L= 2 m, 5 m oder 10 m

9 Electrical Data

The housing cover may only be unscrewed, if the Type 663 is either seperated from the mains or no explosion endangered atmosphere exists. Otherwise danger of explosion because of sparkling, when the ATEX-certified Type 663 is operating in explosion endangered areas!

Before Starting-Up Type 663, the mains must be secured with a microfuse (time delay, 160 mA, breaking capacity C)!

Measuring range:	0... 8 mm/s 0... 16 mm/s 0... 32 mm/s 0... 64 mm/s 0...128 mm/s 0...256 mm/s
Measuring accuracy:	± 5%
Frequency range:	10 Hz...1000 Hz (Standard) 1 Hz ...1000 Hz (optionally)
Output signals:	1 x 4...20 mA 2 x Relay contact (Pre- and Mainalarm)
Relay switching duty:	1A / 30V DC
Voltage supply:	24V DC ±10%
Power input (max.):	80 mA
Shock (max.):	1000 g
Surroundings temperatur:	-20°C...+60°C
Operating temperatur range:	-20°C...+85°C (Meas.-head-temp. a.t. fastening)
Burden/load:	500 Ω
Fusing:	Microfuse (time delay, 160 mA, breaking capacity C)



Note: Each Type 663 has one of the listed measuring ranges. Further ones on request.

Fig. 1: Frequency range 10 Hz...1000 Hz

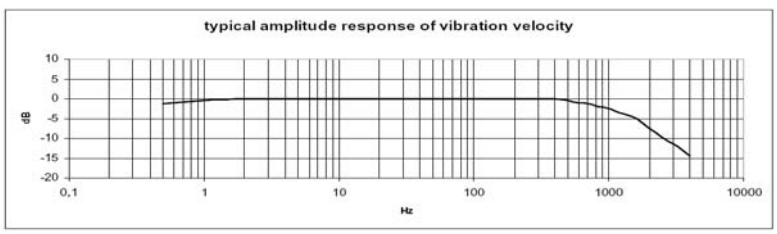


Fig. 2: Frequency range 1 Hz...1000 Hz

10 Mechanical Data

Housing Material:	Stainless Steel V2A; material no: 1.4305
M12-connector material:	CuZn (brass), nickel plated
Fastening:	Inner hexagon screw, M8 x 20 mm
Securing:	The sensor must be earthed via the M8 fastening (see chapt.15).
Weight:	ca. 500 g
Protection Style:	IP 67

Housing Dimensions and Direction of Measurement

Standard, Zone-2-22

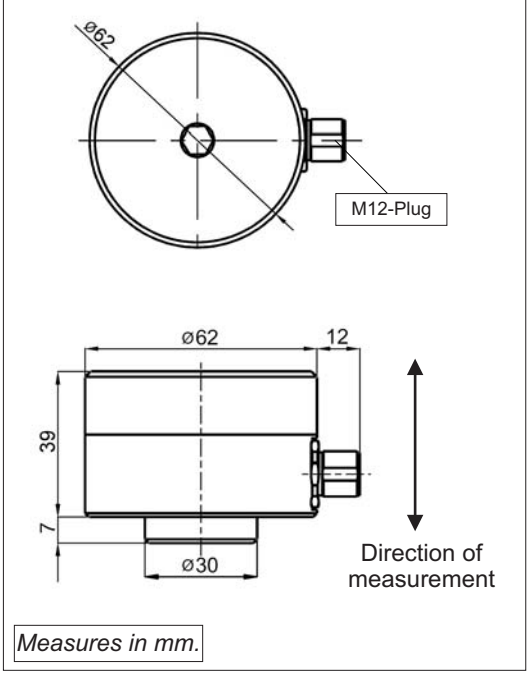


Fig. 3: Housing Dimensions and Direction of Measurement: Standard, Zone-2-22

Zone-1-21

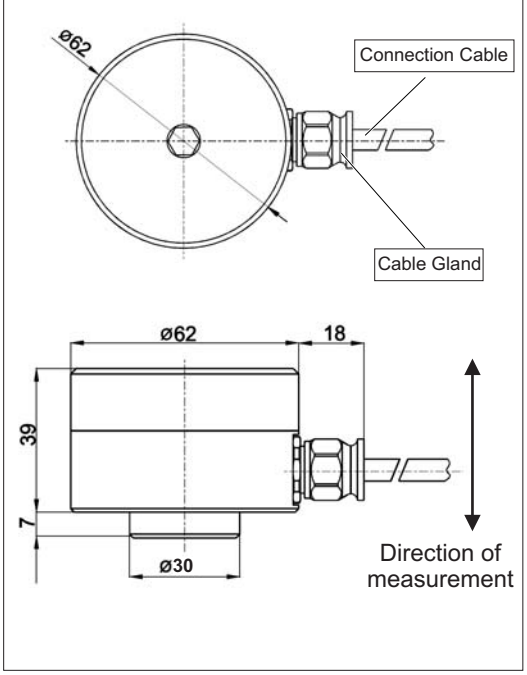


Fig. 4: Housing Dimensions and Direction of Measurement: Zone-1-21

Note: Direction of Measurement = Direction of Fastening

11 Connections

Standard, Zone-2-22

M12-Plug

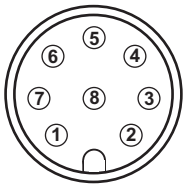


Fig. 5: M12-Plug, 8-pole.
Pin allocation see Connection Plan.

Connection Cable Socket
(Supplies)

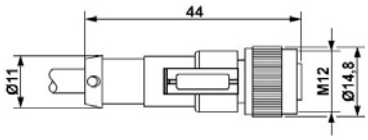


Fig. 6: Connection cable socket M12, 8-pole, 0,25 mm². Pin allocation see Connection Plan.

Zone-1-21

Connection Cable

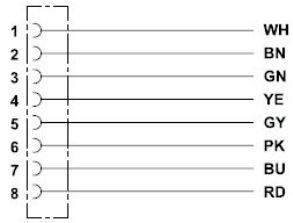


Fig. 7: PUR-sheathed-cable 8 -pole 0,25 mm². Pin allocation see Connection Plan.

Connection Plan for all 3 Variants

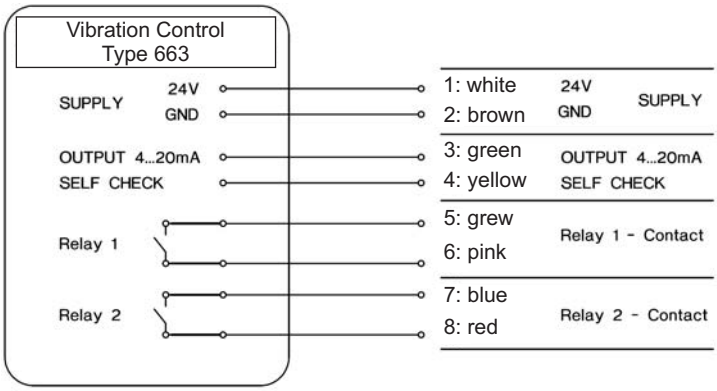


Fig. 8: Connection Plan Type 663

Note: Displayed in the Connection Plan is the Alarm Condition resp. Currentless Condition! The Relays 1 and 2 are dropped out. (Further informations on operating states, chap. 12)

12 Functional Description

The housing cover may only be unscrewed, if the Type 663 is either seperated from the mains or no explosion endangered atmosphere exists. Otherwise danger of explosion because of sparkling, when the ATEX-certified Type 663 is operating in explosion endangered areas!

The Typ 663 consistes of two channels LIM1 and LIM2 independent from each other. Both channels are constructed identically.
For both channels the Limit Value and the Delay Time can be adjusted seperately.
The exceeding of the adjustable Limit Value is signalled via relay outputs. This can be used to generate a pre- and a main alarm.
In addition the Typ 663 has a analogue current output. This delivers a direct current from 4...20 mA proportional to the vibration amplitude.

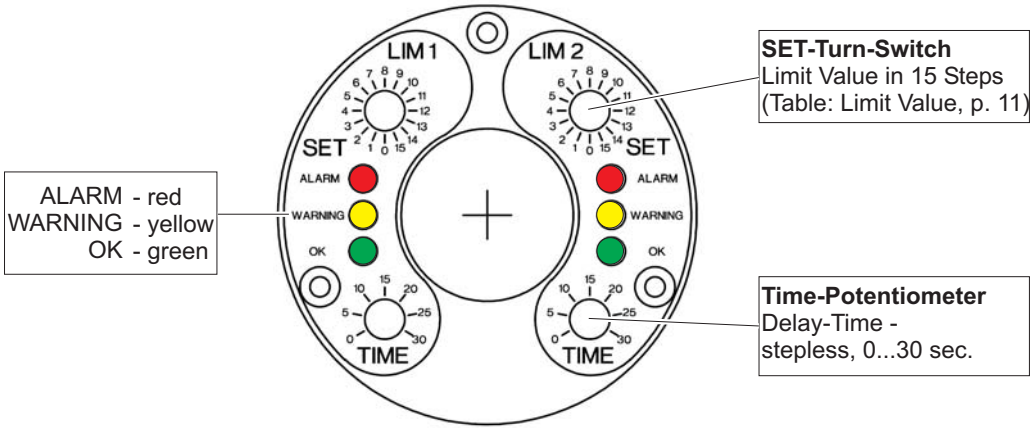


Fig. 9: User Interface Channels LIM1 and LIM2 - Controls and LED-Indicators

Operating Conditions Channels LIM1 and LIM2

Operating Condition	Measurement	Relais	LED-Anzeige
OK	< Limit Value	energized	OK
WARNING	> Limit Value, Delay Time running	energized	WARNING+OK
ALARM	> Limit Value, Delay Time expired	dropped out	ALARM

13 Limit Value Adjustment

SET-Turn-Switch Position	Limit Value					
	Range 0…8 mm/s	Range 0…16 mm/s	Range 0…32 mm/s	Range 0…64 mm/s	Range 0…128 mm/s	Range 0…256 mm/s
0	0	0	0	0	0	0
1	0,5	1	2	4	8	16
2	1	2	4	8	16	32
3	1,5	3	6	12	24	48
4	2	4	8	16	32	64
5	2,5	5	10	20	40	80
6	3	6	12	24	48	96
7	3,5	7	14	28	56	112
8	4	8	16	32	64	128
9	4,5	9	18	36	72	144
10	5	10	20	40	80	160
11	5,5	11	22	44	88	176
12	6	12	24	48	96	192
13	6,5	13	26	52	104	208
14	7	14	28	56	112	224
15	7,5	15	30	60	120	240

Example: Limit Value Adjustment

Measuring Range e.g.: 0...32 mm/s

SET-Turn-Switch Pos.: 8

Limit Value: **16 mm/s**

14 Self Check

Applying a rectangular signal (24 V DC / 0,5 Hz) at pin 4, the Typ 663 overall functionality can be checked. The test voltage simulates an vibration amplitude, that exceeds the maximum Limit Value step.
To check the relays switch functionality the adjusted Delay Time has to be considered.

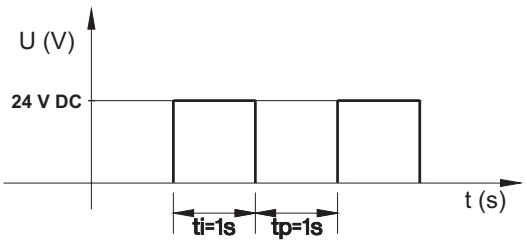


Fig. 10: Self Check-Signal

15 Mounting and Dismounting

Mounting and Dismounting works at and with the Control may only be executed by an authorized expert, familiar with the safety instructions for handling electrical components. For handling ATEX-certified controls within explosion endangered surroundings the expert in addition has to be familiar with the safety instructions relevant there.

Before mounting and dismounting works the control has to be seperated from the mains! Seperated plug and socket devices always have to be disconnected from the mains! Otherwise danger of explosion because of sparkling, when operating ATEX-certified Types 663 in explosion endangered areas!

The control housing must be earthed via ist fastening - i. e. via machine earth or via a seperate earth wire (PE)!

15.1 Fastening at the Mounting Surface

Preconditions

- Mounting surface clean and flat, i.e. free from paint, rust, etc.
- Threaded hole at the Mounting surface:
  Depth: 15 mm
  Thread: M8

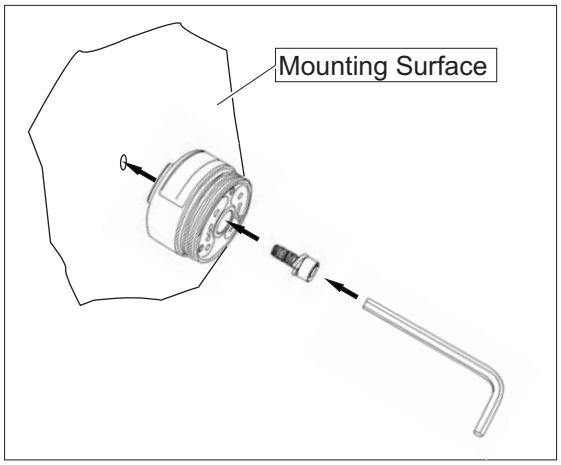


Fig. 11: Fastening at the mounting surface

Tools and Materials

- Allen wrench, SW6, SW8
- Torque wrench SW8
- Allen screw M8x20
- Snapring for M8

Working Steps

1. Unscrew housing cover from housing base.
   - Allen wrench, SW8
2. Fasten control friction-locked at the mounting surface by use of allen screw and snap ring.
   - Allen wrench, SW6
3. Tighten housing cover on housing base loosely by hand.
   (Do not tilt the thread!)
   Tighten housing cover with a tightening torque = 5 Nm.
   - Torque wrench SW8

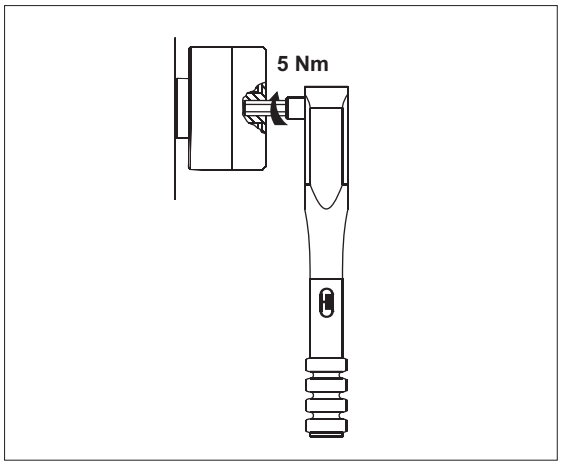


Fig. 12: Tightening housing cover with a torque wrench

Note: To avoid a possible galling of the housing cover with the housing base, it is recommended before the final mounting to treat the housing cover thread with a mounting paste for high-grade steel connections .

15.2 Zone-2-22 - Fastening Safety Clip / Protective Cover

The operation of variant Zone-2-22 is not permitted without the safety clip, to avoid accidently disconnecting the plug-in connection! Otherwise danger of explosion because of sparkling, when operating in explosion endangered areas!

Fastening Safety Clip

1. Plug in the connection cable socket into the M12-plug completely.
   (Pay attention to the code cam!).

2. Tighten firmly the lock-nut of the connection cable socket by hand.

3. Fasten the safety clip against accidental disconnection of the plug connection:
   1. Put both shell halves of the safety clip around the plug connection.
   2. Press together by hand both shell halves of the safety clip until the catch lock snaps in.
   3. Put the arrow connected to one shell halve around the cable, then stick it through the eye on the other end, so that the notice sign is readable alongside the cable.

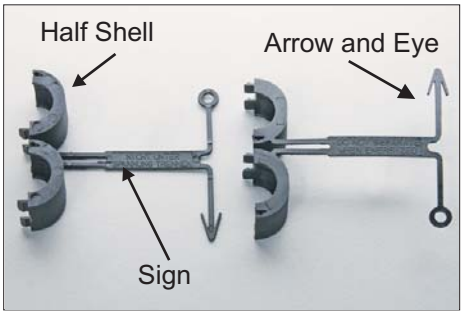


Fig. 13: Safety Clip

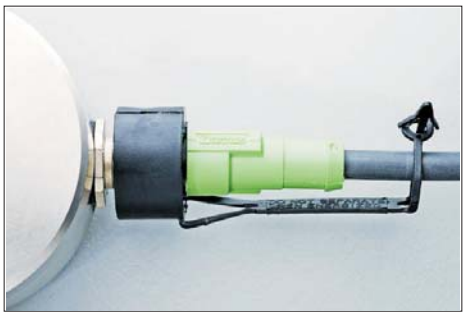


Fig. 14: Fastened Safety Clip

Fastening Protective Cover

After disconnecting the plug connection the protective cover has to be mounted!

Disassemble the safety clip and mount the protective cover:

1. Disconnect mains / electric circuit.
2. Separate both shell halves of the fuse clip with a screw driver.
3. Fasten protective cover and skrew it tightly onto the sensor plug.

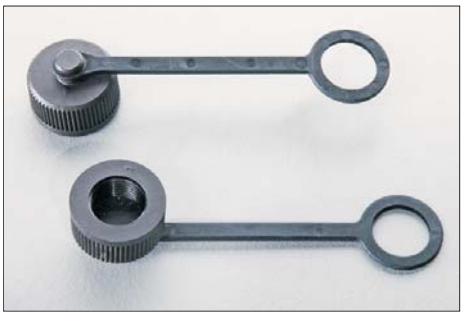


Fig. 15: Protective Cover

Fig. 16: Fastened Protective Cover

16 Installation and Start-Up

Installing and starting-up the control may only be executed by an authorized expert, familiar with the safety instructions for handling electrical components. For handling ATEX-certified controls within explosion endangered surroundings the expert in addition has to be familiar with the safety instructions relevant there.

Starting-up may only be executed with correctly tightened housing cover (tightening torque = 5 Nm)! Otherwise danger of explosion because of sparkling, when operating ATEX-certified Types 663 in explosion endangered areas!

Prior to starting-up the Type 663, the mains must be secured with a microfuse (time delay, 160 mA, breaking capacity C)!

The connection cable and possible extension cables must be protected against electrical influenzes and mechanical damages. Here local regulations and commissions absolutely have to be considered.

17 Maintenance and Repair

Repairing the control may only be executed by an authorized expert, familiar with the safety instructions for handling electrical components. For handling ATEX-certified controls within explosion endangered surroundings the expert in addition has to be familiar with the safety instructions relevant there.

Prior to repair and cleaning works the Type 663 has to be seperated from the mains! Seperated plug and socket devices always have to stay disconnected from the mains! Otherwise danger of explosion because of sparkling, when operating ATEX-certified Types 663 in explosion endangered areas!

Defective connection cables immediately have to be replaced! Otherwise danger of explosion because of sparkling, when operating ATEX-certified Types 663 in explosion endangered areas!

A defective control has to be changed completely!

Note: The Type 663 and ist variants are maintenance free!

Errortable

Error	Cause	Activity
No measured value (4-20 mA)	No pow er supply	Check pow er supply and/or connection cable
	Connection cable interrupted	Replace connection cable
	Fuse defective	Replace fuse
	Wrong connection cable polarity	Provide correct connection cable polarity
	Type 663 defective	Replace Type 663
Relay does not sw itch	Limit Value adjustement w rong	Adjust Limit Value correctly
	No pow er supply	Check pow er supply and/or connection cable
	Connection cable interrupted	Replace connection cable
	Fuse defective	Replace fuse
	Polarity of connection cable w rong	Polarize connection cable correctly
	Type 663 defective	Replace Type 663
Measured value w rong	Type 663 mounting not friction-locked	Mount Type 663 friction-locked
	Type 663 mounting at w rong position	Mount Type 663 at correct position

18 Responsibility for the Safe Operation / Disclaimer

The correct layout of the electrical plant under conditions of explosion protection, as well as the correct switch on procedure, is the sole responsibility of the user of the plant.
The current valid explosion protection rules and security regulations must be adhered to and must be under given circumstances checked by a competent person. Should the plant on the order of the user be erected by a subcontractor, the plant must only be switched on after the subcontractor has submitted an installation certificate as prove of the correct nature of the installation, according to the relevant valid regulations.
The primary switch on of explosion protected plants or part of plants, as well as the subsequent switch on after major adjustments or maintenance work, must be reported to the relevant authorities by the owner.